

# **REMARKS**

Claims 1-11, 16, 17, 19, 21-32, 34-37, 44-76, and 85 are pending in the application.

Claims 38, 39, and 41-43 (which were withdrawn by the Examiner) have been canceled without prejudice to their further prosecution.

The claims have been amended to further clarify the nature of the stiffening component of the claimed devices as a "*molded plastic stiffener component*" that is secured to the substrate without attachment with an adhesive element, and that the stiffener component is effective to increase rigidity of the substrate.

Support for the amendments to the claims is in Applicant's published application (US 2203/0155636) in the *Abstract* (... "to provide *rigidity* and support to the substrate..."), *paragraph [0006]* ("...in those cases where a *plastic stiffener* is used, a thermoplastic or thermosetting polymeric material is heated and introduced into a mold and, upon cooling, the mold is opened and a plastic stiffener is produced..."), *paragraph [0010]* ("...Advantageously, the molded stiffener can provide stiffening to the substrate, or increase the *rigidity* to the substrate."), *paragraph [0021]* ("...or the arrangement of the *components* ... Like reference numerals are used to indicate like *components*."), *paragraph [0051]* ("...provide one *component* (i.e., molded stiffener or lead frame) with dimensions that correspond to the dimensions of the other *component*.")

## **Rejection of Claims under 35 USC § 102(b) (Malik)**

The Examiner maintains the rejection of Claims 1 and 85 under Section 102(b) as anticipated by USP 4,891,687 (Malik). This rejection is respectfully traversed.

In response to Applicant's arguments, the Examiner stated as follows (Office Action at page 8, emphasis added):

...applicant's argue that Malik does not disclose a "molded" stiffener. As stated in the rejection, applicants direct the claims 1 and 85 to a device. *Thus, the term "molded" denotes a process step....*

The Examiner is in error.

Claims 1 and 85 (as amended) recite a "molded plastic" stiffener component (emphasis added):

1. A semiconductor device comprising:  
a substrate; and  
a *molded plastic stiffener component* secured to the substrate without attachment with an adhesive element...

85. A semiconductor device comprising: *a molded plastic stiffener component* secured to a substrate without attachment with an adhesive element.

The term "molded" in the claims does not denote a process step.

The Examiner is directed to the definition of the term "**molded**" at page 1454 of *Webster's Third New International Dictionary*, G&C Merriam Co., Springfield, MA (1981) (copy enclosed):

Molded...*adj* ...**2a**: formed in or on a mold ...blown in a mold...

In the context of the claims, the term "molded" is an adjective (not a verb) – that modifies the terms "plastic" and "stiffener component."

The phrase "molded plastic stiffener component" clearly describes the nature and structure of the stiffener component as being a *plastic part or component that has been formed within or on a mold*. As such, the plastic component has a structure and form according to the mold that is used.

The Examiner is further directed to the followed enclosed articles, which demonstrate that the phrase "**molded plastic component**" is a phrase that is clearly understood in the art.

- a) *Experts in 'molded plastic part'*, Expert Consulting and Expert Witness Services, 2006 – which defines the phrase "*molded plastic part*" to mean "a plastic part that has been formed by a molding process" (at [www.intota.com/multisearch.asp?strSearchType=all&strQuery=molded+plastic+part](http://www.intota.com/multisearch.asp?strSearchType=all&strQuery=molded+plastic+part)).
- b) *Maryland Plastic Products-Manufacturer of molded plastic products* (at <http://www.marylandplasticprdts.com>).
- c) *Sonoco – Molded Plastics*, Sonoco Products Co. (2006) (at <http://www.sonoco.com/topnav/products+and+services/other+products+and+services/molded+and+extruded+plastics/molded+plastics+-+home.htm> )

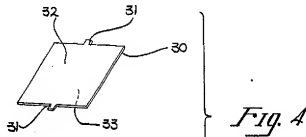
The term "molded" *in the context of the claims and as understood in the art* -- is *not* a process step, as asserted by the Examiner. The term "molded" characterizes *the structure* of the plastic stiffener component – as *a part formed in or on a mold*.

One skilled in the art would clearly understand this term to identify the structure and make-up of the stiffener component.

With regard to Mallik, the Examiner has cited to substrate **30** and element **31** in FIG. 9.

Mallik does not teach or suggest a molded plastic stiffener component secured to a substrate.

Mallik describes a metal plate **30** – with metal tabs **31** that are continuous with the metal plate **30**. Substrate **30** is a metal plate that is stamped to form tabs **31**. See Mallik at col. 3, lines 41-48 and FIG. 4 below (emphasis added):



Referring to FIG. 4, a metal plate 30 is stamped to have dimensions substantially similar to the dimensions of tape 18 of FIG. 1. Plate 30 of the preferred embodiment is formed from a copper material and is silver plated on one surface 32. Plate 30 includes tabs 31 which will mate with appropriate leads 11 of leadframe 10 of FIG. 3. ...

The tabs **31** are not a plastic component that is "secured to" the metal plate **30**. The tabs **31** are metal and continuous with and part of the metal plate itself.

Nor do tabs **31** "increase rigidity of the substrate" as recited in Claim 1. Tabs **31** extend outward from the edges of plate **30** and are not structured to increase the rigidity of plate **30**.

Mallik does not teach or suggest Applicant's devices as claimed. Accordingly, withdrawal of the rejection of Claims 1 and 85 is respectfully requested.

#### **Rejection of Claims under 35 USC § 103(a)** (Mallik with APA, Culnane)

The Examiner maintains the rejection of Claims 9-11, 16-17, 23-24, 28, 34-45, 44-45, 48-49, 55-58, 60, and 62-76 as obvious over *Mallik* in view of "Admitted Prior Art" (APA), citing to Applicant's FIGS. 1-2 and specification at pages 1-2.

The Examiner also maintains the rejection of Claim 47 as obvious over the *Mallik* in view of APA, further in view of USP 6,517,662 (Culnane), citing to Culnane at col. 6, lines 34-50.

These rejections are respectfully traversed.

In response to Applicant's arguments, the Examiner stated as follows (Office Action at pages 8-9, emphasis added):

...applicants argue the references can not be combined. In response to applicant's argument that there is no suggestion to combine the references... In this case, Malik and APA are in the same field of endeavors. Thus, one of ordinary skill in the art recognizes that the teaching of Malik and APA can produce the claimed invention.

With respect to claim 47, Culnane is also in the same field of endeavors. Culnane teaches the bonding of the stiffener to the substrate by the claimed process. Thus, Culnane cures the deficiency of Malik and APA.

The Examiner has failed to fairly consider Applicant's previously submitted arguments.

The Examiner's contention is that it would be obvious to modify Mallik's device to incorporate a thermoplastic/thermosetting material for a "stiffener."

First of all, one skilled in the art reading Mallik's disclosure would not form either plate 30 or tabs 31 of Mallik's device *from a plastic material*.

Plate 30 forms the ground plane of the device. *Tabs 31 of Mallik's device are ground tabs to mate with leads 11 of leadframe 10 to couple the ground plane 53.*

For that purpose – both plate 30 and tabs 31 are metal.

Clearly, one skilled in the art reading Mallik's disclosure would not form tabs 31 out of a plastic material.

Furthermore, even if, *arguendo*, one were to form tabs 31 of a plastic material, the "APA" specifically teaches adhesively attaching a stiffener to a substrate. See Applicant's published application US 2203/0155636, Background discussion at paragraphs [0003]-[0006].

[0003] Referring to FIG. 1, a prior art semiconductor die package 2 ... is shown. Package 2 typically comprises a lead frame 6 (or other substrate), adhesive element 8, one or more dies 10, adhesive element 12, a metal or plastic stiffener 14, and an encapsulating material 16...

[0004] The package illustrated in FIG. 1 can be assembled by first constructing a die assembly 24. ...After die assembly 24 is assembled, *plastic or metal stiffener 14 is secured to lead frame 6 of die assembly 24 with adhesive element 12*...

...

[0006] Plastic stiffeners have also been used to support a lead frame. Typically, in those cases where a plastic stiffener is used, a thermoplastic or thermosetting polymeric material is heated and introduced into a mold and, upon cooling, *the mold is opened and a plastic stiffener is produced*. Thereafter, *the plastic stiffener is secured to the lead frame using an adhesive tape or paste*.

In the background discussion of the prior art, Applicant clearly states that prior art *stiffeners are attached to the substrate by an adhesive.*

However, Mallik forms tabs **31** by stamping a blank sheet to simultaneously form plate **30** with *contiguous and connected* tabs **31**. With Mallik's plate **30** – tabs **31** are formed already attached to plate **30**. Therefore, there is no reason to adhesively attach tabs **31** to plate **30** as practiced in the prior art.

The combination of Mallik with "APA" would not provide Applicant's devices as claimed – having a *molded plastic stiffening component* secured to a substrate without adhesive attachment.

Nor do those disclosures teach or suggest Applicant's methods of securing a stiffener to a substrate, as recited in any of Claims 44-54 and 62-76 and 85.

In particular, neither reference remotely describes applying a stiffener material onto a substrate, and then *hardening the stiffener material on the substrate* to form a molded stiffener – which is attached to the substrate without adhesive, as in Claims 44, 73, and 74.

Nor do the references describe molding a stiffener material *onto the surface of a substrate*, as in any of Claims 48, 62, and 63.

As for Culnane, that reference (like the APA) teaches bonding a stiffener **10** using an adhesive 20 attachment.

Culnane does not teach forming a stiffener by applying a material onto a substrate and hardening the material by heating, cooling, or curing. Rather, Culnane teaches applying heat and pressure to *cure the adhesive 20* – which attaches the stiffener material **10** to substrate **4**.

Mallik, either alone or combined with APA and/or Culnane, does not teach or suggest Applicant's invention as claimed. Accordingly, withdrawal of this rejection of the claims is respectfully requested.

#### **Rejection of Claims Under 35 USC § 103 (Mallik with Lim)**

The Examiner rejected Claims 2-8, 11, and 37 as obvious over the Mallik in view of USP 6,020,221 (Lim). This rejection is respectfully traversed.

The Examiner asserts that it would be obvious to modify Mallik's device with the various materials taught by Lim.

Claims 2-8 and 11 depend from Claim 1, and Claim 37 depends from Claim 34.

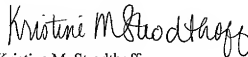
For the reasons stated above regarding the failure of Mallik to teach the claimed devices, Lim's disclosure does not overcome the deficiencies of Mallik to provide Applicant's device as claimed.

Accordingly, withdrawal of the rejection of Claims 2-8, 11, and 37 is respectfully requested.

**Extension of Term.** The proceedings herein are for a patent application and the provisions of 37 CFR § 1.136 apply. Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that Applicant has inadvertently overlooked the need for a petition for extension of time. If any extension and/or fee are required, please charge Account No. 23-2053.

It is respectfully submitted that the claims are in condition for allowance and notification to that effect is earnestly solicited.

Respectfully submitted,



Kristine M. Strodthoff  
Reg. No. 34,259

Dated: September 28, 2006

WHYTE HIRSCHBOECK DUDEK S.C.  
555 East Wells Street  
Suite 1900  
Milwaukee, Wisconsin 53202-3819  
(414) 273-2100

Customer No. 31870